

REMARKS

This paper is responsive to any paper(s) indicated above, and is responsive in any other manner indicated below.

THREE (3) MONTH SUSPENSION

The RCE transmittal filed concurrently herewith includes a request for a three (3) month suspension, for the purposes of affording time for an examiner interview and/or to afford time for consideration of further amendments and/or arguments.

STATEMENT OF SUBSTANCE / NON-FINAL RCE FIRST OFFICE ACTION

The 31 October 2007 telephonic examiner interview (by and between Examiner Ram K. KACKAR and the undersigned) is respectfully noted; in such interview, it was agreed by the Examiner that if the present RCE was filed with claim amendments corresponding to those faxed to the Examiner and discussed during the telephonic examiner interview, then the Examiner would not make a first action final. It is respectfully submitted that the claim amendments submitted herewith correspond to those faxed/discussed during the examiner interview. The Examiner is thanked for such interview, and for allowing Applicant to avoid the procedural/administrative delays associated with an after-final amendment and advisory action process.

PENDING CLAIMS

Claims 1-6 and 10-25 were pending in the application. Appropriate claims have been amended, canceled and/or added (without prejudice or disclaimer) in

order to adjust a clarity and/or focus of Applicant's claimed invention. That is, such changes are unrelated to any prior art or scope adjustment and are simply refocused claims in which Applicant is presently interested. At entry of this paper, Claims 1-6 and 10-25 will be pending for further consideration and examination in the application.

REJECTION UNDER '112, 1st and 2nd PAR. - TRAVERSED

Claims 18-25 have been rejected under 35 USC '112, first and second paragraph, as failing to comply with the written description requirement and for being indefinite for the concerns listed within the sections numbered "2 and 4" beginning on page 2 of the Office Action. Applicant respectfully traverses because the quoted claim limitations are supported, for example, within Applicant's original specification, for example, at pages 14-15 and also see Applicant's FIGS. 3, 5A-C, 6 and 10A-B, and at page 15, line 22 through page 16, last line. Regarding the '112, 2nd paragraph rejection, additional guidance is necessary from the Examiner as to exactly which part of the large quoted claim limitations is indefinite, i.e., such limitations appear to be clear to the Undersigned.

As the foregoing is believed to have addressed all '112 second paragraph concerns, reconsideration and withdrawal of the '112 second paragraph rejection are respectfully requested.

REJECTION(S) UNDER 35 USC '103

The 35 USC '103 rejection is respectfully traversed. However, such rejections have been rendered obsolete by the present clarifying amendments to Applicant's

claims, and accordingly, traversal arguments are not appropriate at this time.

However, Applicant respectfully submits the following to preclude renewal of any such rejections against Applicant's clarified claims.

All descriptions of Applicant's disclosed and claimed invention, and all descriptions and rebuttal arguments regarding the applied prior art, as previously submitted by Applicant in any form, are repeated and incorporated hereat by reference. Further, all Office Action statements regarding the prior art rejections are respectfully traversed. As additional arguments, Applicant respectfully submits the following initial arguments from Applicant's foreign patent representative.

The Examiner still repeats the obviousness rejection of all apparatus claims 1-6 and 10-25 relying on the combination of Kagoshima et al and Rauf et al "Modeling the Impact of Photoresist Process Trim Etch Process On Photoresist Surface Roughness" which is referenced in the present specification. Particularly, Applicants note the Examiner's repetition of his comment stating "Shahid Rauf et al have extensively studied dependence of etch rate upon roughness (undulation) when all other factors remain same. They teach that the etch rate is high at the beginning if the initial roughness is high, and reduces when the roughness is reduced. So that it is essential to (a) know the initial roughness in order to (b) estimate etch time needed to etch to target CD."

Applicant respectfully counters that Rauf et al, however, does not disclose the above-underlined portions (a) and (b) anywhere. The underlined portions are mere groundless assumptions by the Examiner without corroboration. If the Examiner disagree, Applicant respectfully requests that the relevant portions in the Rauf et al publication should be pointed out by the Examiner to Applicants.

In continuing discussions, Fig.1 of Rauf et al merely gives the definition of roughness as an unevenness expressed by R. Fig. 4 shows that the rate of roughness reduction changes with time, that is, the degree of unevenness decreases as the etch time increases. As to the correlation between the roughness and the etch time Rauf refers to the degree of surface roughness, whereas Applicants invention relates to the degree of line edge roughness. Thus, this invention differs from Rauf et al in objects to be processed.

Kagoshima et al. does not cure the major deficiencies mentioned above with respect to the primary Rauf et al. reference.

In addition to the foregoing, the following additional remarks from the Undersigned are also submitted in support of traversal of the rejection and patentability of Applicant's claims.

Claims 18 and 20-50 substantially parallel claims 10-15 and 17, respectively, but use different terminology and include greater detailed limitations. More particularly, independent claim 18 recites (in relevant part), "trimming condition calculating means for automatically calculating a trimming condition including trimming timing required for said trimming treatment to obtain a desired mask width by taking into consideration a pre-measured width dimension of said patterned mask and a pre-measured amount of line edge perimeter corrugation extending along vertical mask sidewalls, as well as the amount of radicals and the amount of ions measured by said plasma monitor, wherein the line edge of the vertical mask sidewalls has corrugation consisting of alternating ridges and grooves, and wherein the amount of line edge corrugation is defined as a protrusion amount of ones of the ridges of the line edge divided by a protrusion width of the ones

of the ridges of the line edge; wherein the trimming treatment is carried out for the trimming condition including the trimming timing, calculated by said trimming condition calculating means.

Support for use of the “corrugation”, “protrusion amount” and “protrusion width” limitations can be found within Applicant’s original specification, for example, at pages 14-15 and also see Applicant’s FIGS. 3, 5A-C, 6 and 10A-B. Further, it is respectfully noted that Websters II New College Dictionary, copyright 1999, at page 254, defines “corrugation” as “The state of being corrugated”, and defines “corrugate” as “To form or become formed into folds or parallel and alternating ridges and grooves.”

Turning now to rebuttal of the applied art, the cited Rauf et al. article’s model (discussed within Rauf et al.) only **concerns generalized surface roughness (i.e., not a perimeter edge)**, and specifically excludes (see page 656, right column, ending lines of paragraph which begins as “Experiments have shown...”) **“vertical striations”** (analogous to Applicant’s “corrugations”). Accordingly, it is respectfully submitted that Rauf et al. nowhere discloses Applicant’s arrangement using “a pre-measured amount of **line edge perimeter corrugation extending along vertical mask sidewalls, ..., wherein the line edge of the vertical mask sidewalls has corrugation consisting of alternating ridges and grooves, and wherein the amount of line edge perimeter corrugation is defined as a protrusion amount of ones of the ridges of the line edge divided by a protrusion width of the ones of the ridges of the line edge; wherein the trimming treatment is carried out for the trimming condition including the trimming timing, calculated by said**

trimming condition calculating means.” That is, Rauf et al.’s taught generalized surface roughness is vastly different from Applicant’s “line edge corrugation” features. None of the other references cure this major deficiency with respect to the Rauf et al. reference.

Continuing, claim 19 recites, “wherein the trimming condition calculating means automatically calculating the trimming condition **including both a line edge perimeter corrugation trimming time and a mask proper trimming time,** **wherein the line edge perimeter corrugation trimming time is directed to lessening the amount of the line edge perimeter corrugation of the patterned mask, and the mask proper trimming time is directed to lessening a width of a major body of the patterned mask;** and wherein the trimming treatment is carried out for the trimming condition **including the line edge perimeter corrugation trimming time and the mask proper trimming time,** calculated by said trimming condition calculating means.” Support for such timings may be found within Applicant’s specification beginning at page 15, line 22 through page 16, last line.

Again rebutting the Rauf et al. reference, such reference is deficient in not teaching the separate timings utilized within Applicant’s claimed trimming condition. Especially given the fact that Rauf et al. does not address line edge corrugation. None of the other references cure this major deficiency with respect to the Rauf et al. reference.

As a result of all of the foregoing, it is respectfully submitted that the applied art (taken alone and in the Office Action combinations) would not support a '103 obviousness-type rejection of Applicant's claims. Accordingly, reconsideration and

withdrawal of such '103 rejection, and express written allowance of all of the '103 rejected claims, are respectfully requested.

EXAMINER INVITED TO TELEPHONE

The Examiner is herein invited to telephone the undersigned attorneys at the local Washington, D.C. area telephone number of 703/312-6600 for discussing any Examiner's Amendments or other suggested actions for accelerating prosecution and moving the present application to allowance.

RESERVATION OF RIGHTS

It is respectfully submitted that any and all claim amendments and/or cancellations submitted within this paper and throughout prosecution of the present application are without prejudice or disclaimer. That is, any above statements, or any present amendment or cancellation of claims (all made without prejudice or disclaimer), should not be taken as an indication or admission that any objection/rejection was valid, or as a disclaimer of any scope or subject matter. Applicant respectfully reserves all rights to file subsequent related application(s) (including reissue applications) directed to any/all previously claimed limitations/features which have been subsequently amended or cancelled, or to any/all limitations/features not yet claimed, i.e., Applicant continues (indefinitely) to maintain no intention or desire to dedicate or surrender any limitations/features of subject matter of the present application to the public.

CONCLUSION

In view of the foregoing amendments and remarks, Applicant respectfully submits that the claims listed above as presently being under consideration in the application are now in condition for allowance.

To the extent necessary, Applicant petitions for an extension of time under 37 CFR '1.136. Authorization is herein given to charge any shortage in the fees, including extension of time fees and excess claim fees, to Deposit Account No. 01-2135 (Case No. 500.43597X00) and please credit any excess fees to such deposit account.

Based upon all of the foregoing, allowance of all presently-pending claims is respectfully requested.

Respectfully submitted,

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